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A Pilot Study of Bibliotherapy to Reduce Alcohol Problems among Patients in a Hospital Trauma Center

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Because alcohol use plays a major role in many injuries that require hospital care, there is increasing interest in developing interventions to address alcohol problems among emergency department and trauma center patients. The aim of the current study was to extend past research on brief interventions by investigating the use of a self-help manual to treat problem drinkers in a hospital trauma center. Forty injured patients who were either intoxicated at the time of injury or screened positive for harmful drinking were randomly assigned to receive either a brief assessment and a self-help booklet with no more than 5 minutes clinician contact (bibliotherapy) or brief assessment only. Follow-up data obtained five months after hospital discharge indicated that patients in both conditions made significant reductions in drinking and associated negative consequences. There was a trend toward further treatment-seeking among those in the bibliotherapy condition (40% versus 13%). Results suggest that the provision of self-help materials to treat problem drinkers identified in a hospital trauma setting may not bring about behavior change beyond that observed following hospitalization and an assessment of drinking. Caution in the interpretation of results is warranted due to the small sample size.

Keywords Alcohol abuse, Emergency services, Hospitals, Self-help Techniques

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INTRODUCTION

Attention has been increasingly directed to earlier detection of alcohol abuse through screening, and providing brief interventions for people who are at an earlier stage of developing problems with alcohol (Institute of Medicine, 1990). Use of early, brief interventions may prevent the development of more severe and difficult-to-treat cases of alcohol problems (Bien, Miller, & Tonigan, 1993; Moyer, Finney, Swearingen, & Vergun, 2002; Wilk, Jenson, & Havighurst, 1997) and may reduce the risk of future health problems or injury (Gentilello et al., 1999).

A common component of brief interventions is the provision of self-help materials, or bibliotherapy. Miller and colleagues have reported the efficacy of a self-help manual at bringing about reductions in drinking and associated problems for self-referred problem drinkers (Miller, 1978; Miller, Gribskov, & Mortell, 1981; Miller, & Taylor, 1980; Miller, Taylor, & West, 1980), with evidence for maintenance of gains lasting up to eight years (Miller, Leckman, Delaney, & Tinkcom, 1992). Similar findings have been reported by research groups in a variety of countries (e.g., Cunningham, Sdao-Jarvie, Kroski-Jannes, & Breslin, 2001; Heather, Kisson-Singh, & Fenton, 1990; Sanchez-Craig, Davila, & Cooper, 1996). A recent meta-analysis summarizing the literature on bibliotherapy for alcohol problems reported a within-group effect size of about 0.8 across these studies, reflecting a reduction of almost one standard deviation (Apodaca, & Miller, 2003), providing compelling evidence for the utility of self-help materials for individuals seeking treatment.

However, it is less clear whether the efficacy of bibliotherapy extends to heavy drinkers who are identified through screening in medical settings, who are not seeking treatment for alcohol problems. The meta-analysis by Apodaca and Miller (2003) identified nine such studies, and reported bibliotherapy to be

more effective than control conditions in only four of the nine studies, while the remaining five studies showed no beneficial effect of bibliotherapy compared to control conditions.

While most brief intervention research has focused on primary care providers, an important setting in which brief interventions should be more widely implemented is in critical care settings such as emergency departments (EDs) and trauma centers. Alcohol is one of the primary causes of injuries that require costly care in a trauma center, such as motor vehicle crashes, falls, stabbings and gunshot wounds, with up to 47% of trauma patients intoxicated at the time of injury (Rivara et al., 1993; Soderstrom et al., 1997). A recent study of trauma patients admitted with a positive blood alcohol concentration (BAC) reported that 84% of these patients reported contemplating making a change in their drinking or already taking steps to do so, while only 16% reported a lack of concern about their use of alcohol (Apodaca, & Schermer, 2003). The idea that patients in the midst of experiencing physical distress related to their alcohol use may be ready to change their drinking has been described as a "teachable moment" (Longabaugh et al., 1995). The unique opportunity to provide brief intervention following an alcohol-related injury is under-utilized, however, as a recent survey reported that only 55% of trauma centers currently screen patients for alcohol problems, and only 37% provide brief intervention (Schermer et al., 2003b).

One reason for this under-utilization is that only about one third of trauma surgeons believe that brief interventions are effective in reducing alcohol abuse (Danielsson, Rivara, Gentilello, & Maier, 1999). Medical staff such as ED and trauma physicians and nurses may not be convinced by data from studies conducted in primary care or community health settings; rather, demonstrated effectiveness of brief intervention through studies conducted in critical care settings is necessary (Hungerford, & Pollock, 2002). Several large-scale clinical research trials have published results of brief interventions in EDs or trauma centers to reduce drinking or associated problems (Gentilello et al., 1999; Longabaugh et al., 2001; Monti et al., 1999). These studies have provided evidence that brief interventions (adaptations of motivational interviewing in all three cases) can be effective at bringing about reductions in drinking and associated problems in this setting, but have required several hours of researcher or clinician time that may not be realistic in many busy critical care settings. In fact, the most common reason brief intervention is not conducted in trauma centers is that medical staff are "too busy," according to a nationwide survey of trauma surgeons (Danielsson et al., 1999). The aim of the present study was to extend past research on brief interventions and bibliotherapy by investigating the use of a self-help manual to treat problem drinkers in a busy trauma setting, with minimal clinician contact. It was expected that those receiving a self-help manual would show greater reductions in drinking, experience fewer negative consequences of drinking, and would seek additional support, resources, or treatment more frequently in comparison to the control group.

METHODS

Participants

Participants were recruited from the University of New Mexico Hospital (UNMH) Trauma Center. Motor vehicle drivers and passengers residing within the state of New Mexico were not approached for the study because they represented the target population of a separate ongoing research study at UNMH. However, motor vehicle drivers and passengers from states other than New Mexico were eligible for the study. Study staff consulted daily trauma census reports to identify potential participants. Inclusion criteria for the current study were: admitted to the UNMH Trauma Center, age 18 or older, and evidence of potential harmful drinking as evidenced by either a positive blood alcohol concentration (BAC) at time of hospital admission or a score of eight or higher on the Alcohol Use Disorders Identification Test (AUDIT, Saunders, Aasland, Babor, De La Fuente, & Grant, 1993). Exclusion criteria were: evidence of brain injury, under age 18, New Mexico resident injured in a motor vehicle crash. A total of 40 participants were recruited into the study over a nine-month period.

Materials

Patients who screened positive via AUDIT score of eight or higher ($n = 15$), or had a positive BAC ($n = 25$) upon hospital admission, and consented to participate in the study, were given a brief assessment. Information was gathered regarding alcohol consumption, negative consequences experienced as a result of alcohol, and stage of change.

To measure drinking behavior, a three-item questionnaire was administered to obtain information on the quantity and frequency of alcohol use, as well as number of heavy drinking days over the previous month. The AUDIT was also administered. If the patient met inclusion criteria through a positive BAC upon hospital admission, the AUDIT was given as part of the assessment. If the patient qualified for the study due to an AUDIT score of eight or higher, the instrument was not administered a second time. The instrument contains three questions about alcohol use, four about dependence, and three about problems resulting from drinking. The responses to the ten questions are each scored from 0 to 4, with a maximum score of 40. An AUDIT score of eight or higher is a reliable cutoff score to detect hazardous or harmful use of alcohol, with a sensitivity of 92 percent, and a specificity of 87 percent (Saunders et al., 1993).

Negative consequences of drinking were measured using the Short Inventory of Problems (SIP), a brief (15-item) version of the Drinker Inventory of Consequences (Miller, Tonigan, & Longabaugh, 1995). The SIP has well-established psychometric properties, including an internal consistency coefficient (Cronbach) of .91 for the total consequence score, which was used for analyses. Higher scores (possible range: 0–45) indicate more negative consequences experienced as a result of drinking.

Level of motivation to change drinking behavior was assessed using the 12-item Readiness to Change Questionnaire (RTCQ, Rollnick, Heather, Gold, & Hall, 1992), which is designed to measure thoughts and behaviors associated with stages of change found most often among persons in health care settings (precontemplation, contemplation, and action). Precontemplation items refer to denial of alcohol-related problems. Contemplation items refer to beliefs that alcohol may be a problem, while action items reflect behavior changes the person is already making to cut down or stop drinking. Internal consistency of the scales range from .73 to .80, with test-retest reliabilities ranging from .78 to .86 (Rollnick et al., 1992).

At follow-up assessment, patients were asked whether they had sought further support, resources, or treatment for alcohol use since hospital discharge. A one-page questionnaire was also administered to assess the acceptability of the intervention.

The self-help booklet given to individuals in the bibliotherapy condition was entitled, "Alcohol, & You: Get the picture, Make the change!" The booklet was originally published by the Addiction Research Foundation in Canada, and has been empirically evaluated previously (Cunningham et al., 2001). The booklet, which was 16 pages in length, was modified for use in the present study by permission. Contained within the booklet was one page of feedback gathered from the assessment, normative data on drinking habits of adults nationwide, educational information on what constitutes a "standard drink," guidelines for low-risk drinking (National Institute on Alcohol Abuse and Alcoholism, 1992), and indicators of risky drinking. Additionally the booklet provided a blank drinking record and instructions on how to track a week of drinking, information on what to expect should one decide to make a change in drinking, a decisional balance exercise, guidelines for setting a drinking goal, specific behavioral strategies to cut down on drinking, and a list of further resources for change. Copies of the booklet may be obtained from the first author.

Procedures

Study staff consulted the daily trauma census at UNMH for potential participants during pre-designated periods of staff availability (Monday–Friday, 8:30 a.m.–4:30 p.m.) BAC level had been drawn as part of routine patient care in 28 of the 40 participants (70%). Three of the 28 had a BAC of 0. All trauma patients (including those with a positive BAC) were screened with the AUDIT. Eligible patients were then approached in their hospital room to request participation in the study. The nature of the study was presented and informed consent was obtained. Contact information was obtained for the participant and at least two locators (family or friends who would know how to contact the participant). The questionnaires took approximately 20 minutes to complete. After the assessment, the researcher opened an envelope that contained the group allocation for that individual. Random assignment to treatment condition ("assessment-only" or "bibliotherapy") was conducted prior to beginning the study

through use of a random sample generator in the SPSS data analysis program. Those who received assessment-only were thanked for their time and were offered a referral list of local substance abuse treatment centers. When a patient was assigned to the bibliotherapy condition, the researcher spent 1 to 2 minutes transcribing pertinent information from the assessment questionnaires into the feedback section of the self-help booklet. Patients were then given a copy of the booklet and no more than 5 minutes of consultation with the researcher as to the contents of the book and how to use it.

All follow-up assessments, which contained the same instruments as the initial assessment, were conducted by phone to minimize the burden on participants, many of whom lived a substantial distance from the city in which the hospital is located. In addition, a one-page questionnaire was administered to assess the acceptability of the intervention, and participants were asked whether they had sought any other support, resources, or treatment for alcohol use since hospital discharge.

Thirty of the original 40 participants were successfully contacted for follow-up assessments, representing 75% of the original sample. There was no differential attrition from groups, with 15 participants contacted at follow-up for each treatment condition. Although attempts to contact participants began at three months, numerous attempts were often required before contact was made, resulting in an average length of follow-up of almost five months ($M = 4.91$ months, $SD = 1.77$; range 3.03–9.50). Patients lost to follow-up ($n = 10$) were compared to participants completing follow-up on the main dependent variables as measured at baseline, and a multivariate analysis of variance (MANOVA) revealed no significant differences, $F(5, 34) = 0.435$, $p = .821$.

Analyses were conducted to compare the effectiveness of bibliotherapy versus assessment only at reducing drinking levels, reducing associated negative consequences, and increasing levels of treatment-seeking at follow-up. After conducting the analyses pertinent to the hypotheses, further analyses were conducted to examine pre-post changes within groups, and reported acceptability of the intervention.

RESULTS

Characteristics of the Sample

Table 1 summarizes characteristics of the sample ($N = 40$) at baseline.

Before conducting the main analyses, a MANOVA was conducted to determine whether participants in each of the treatment groups differed at baseline on any of the dependent variables: number of drinking days in the past month, number of drinks per drinking day, total number of drinks in the past month, heavy drinking days in the last month, and negative consequences of drinking. The MANOVA revealed that the groups did not differ significantly on any of the five variables, $F(5, 34) = 1.608$, $p = .184$.

TABLE 1
Characteristics of sample at baseline ($N = 40$)

Variable	<i>M</i>	<i>SD</i>
Age	32.63	12.42
Years of Education	11.68	1.37
Annual Income	\$12,906	\$10,181
AUDIT Total Score	19.97	7.74
Days Drinking Last Month	12.70	9.81
Drinks per Drinking Day	8.17	3.30
Total Drinks Last Month	113.90	116.54
Heavy Drinking Days Last Month	12.00	10.26
SIP (Negative Consequences)	21.03	11.07
BAC mg/dl ($n = 28$)	167.96	119.26
	%of sample	
Gender		
Male	78%	
Female	22%	
Ethnicity		
American Indian or Alaskan Native	43%	
Hispanic	43%	
White, non-Hispanic	10%	
Black or African-American	2%	
Other	2%	
Employment status		
Full-Time	43%	
Part-Time	12%	
Unemployed	43%	
Retired	2%	
Marital status		
Single	60%	
Married	20%	
Divorced	20%	
Stage of Change from RTCQ		
Precontemplation	5%	
Contemplation	58%	
Action	37%	

Main Analyses

To examine whether bibliotherapy was more effective than assessment-only at reducing drinking, a multivariate analysis of covariance (MANCOVA) was conducted. The MANCOVA used follow-up levels of days drinking last month, drinks per drinking day, total drinks last month, and heavy drinking days last month as the dependent variables, and treatment modality (bibliotherapy or assessment-only) as the independent variable. Baseline levels of dependent variables were entered as covariates. Contrary to predictions, no significant group effect was detected, $F(4, 21) = 1.003, p = .428$. Next, an analysis of covariance (ANCOVA) was conducted to examine whether bibliotherapy was more effective than assessment-only at reducing the number of negative consequences associated with drinking.

The ANCOVA used total negative consequences of drinking (as measured by the SIP) at follow-up as the dependent variable, treatment modality as the independent variable, and baseline negative consequences as the covariate. Again, no significant group effect was detected, $F(1, 27) = 0.006, p = .939$.

Regarding further treatment-seeking, in the bibliotherapy condition, 6 of the 15 (40%) participants reported seeking further support, resources, or treatment between hospital discharge and follow-up assessment, compared with 2 of 15 (13%) in the assessment-only condition. A chi-square analysis revealed a trend toward higher treatment-seeking among those receiving the self-help manual, $\chi^2(1, N = 30) = 2.73, p = .099$.

Post-hoc Analyses

Time effects were also of interest. In order to examine pre-post changes within groups, a series of post-hoc paired t-tests were run. Results indicated that participants in both groups made significant improvements across all measures of drinking and associated negative consequences. An effect size (Cohen's d) was calculated for the within-group difference between baseline and follow-up means, divided by the weighted pooled pre/post standard deviation for each treatment condition. Results are shown in Table 2.

Next, it was examined what percentage of those who had reported drinking above low-risk limits at baseline were drinking within limits at follow-up, as these categorical outcomes might be more meaningful to medical clinicians. Low-risk drinking levels were defined as 14 drinks or less per week for men, and seven drinks or less for women, following guidelines proposed by the National Institute on Alcohol Abuse and Alcoholism (1992). Considering only participants who completed both baseline assessment and follow-up, seven patients in the control group, and ten in the bibliotherapy condition were drinking above low-risk limits at baseline. In both conditions there were only two people drinking above low-risk limits at follow-up. In other words, five of seven controls (71%) and eight of 10 in the bibliotherapy condition (80%) went from risky to low-risk levels. Results are presented in Table 3.

Because an important component of designing opportunistic interventions involves assessing the acceptability of the intervention to patients, measures of this domain were obtained at follow-up. Results indicate that the intervention was well-received by study participants: of the 30 participants contacted at follow-up, 97% reported feeling comfortable talking about alcohol use during hospitalization, and 97% reported that a self-help manual should be offered to other patients in the hospital who may be interested in making a change in their drinking. Of the 15 participants who received a copy of the self-help manual, 93% reported finding it useful.

DISCUSSION

Individuals in both the bibliotherapy and control conditions made significant reductions in drinking and associated negative

TABLE 2
Levels on dependent measures at baseline and follow-up

Measure	Baseline		Follow-up		% change	p^1	d^2
	M	(SD)	M	(SD)			
Days Drinking Last Month							
Bibliotherapy	15.87	(10.76)	6.00	(7.48)	62%	.005	1.07
Assessment-only	9.80	(9.03)	6.33	(10.18)	34%	.002	0.36
Drinks per Day							
Bibliotherapy	7.93	(2.87)	4.20	(4.07)	47%	.001	1.06
Assessment-only	8.13	(3.93)	3.93	(4.62)	52%	.003	0.98
Drinks per Month							
Bibliotherapy	141.87	(127.78)	44.80	(91.18)	68%	.007	0.87
Assessment-only	92.80	(114.89)	57.33	(123.73)	38%	.005	0.30
Heavy Drinking Days							
Bibliotherapy	15.60	(11.10)	3.63	(7.79)	79%	.001	1.25
Assessment-only	8.47	(9.63)	5.00	(10.36)	41%	.004	0.35
Negative Consequences							
Bibliotherapy	23.93	(9.48)	11.87	(13.58)	46%	.001	1.03
Assessment-only	16.87	(11.06)	7.73	(8.15)	54%	.002	0.94

Note: There were no between-group differences at follow-up.

¹ p -value from pre-post within-group paired t-tests

²Effect size (Cohen's d) calculated for within-group difference between baseline and follow-up means, divided by the weighted pooled pre-post standard deviation for each treatment condition.

consequences, regardless of group assignment, and a large majority of participants were drinking within low-risk limits by follow-up. Those who received self-help materials showed a trend toward higher levels of seeking further support, resources, or treatment for alcohol use than those who did not receive the

materials (40% versus 13%). Although this finding did not reach statistical significance, it has clinical significance, because the referral of problem drinkers to receive more treatment is an important outcome measure to many trauma center clinicians (D'Onofrio, & Degutis, 2002). Despite the lack of statistically significant between-group differences in the current study, the observed reductions among participants from both conditions from baseline to follow-up are clinically meaningful. The reduction in heavy drinking days is of particular interest, as high levels of intoxication are likely to be associated with a higher probability of traumatic injury. Indeed, the average BAC among patients in this study was 167 mg/dL (more than two times the legal limit in the state in which the study was conducted). In other words, most injuries for these patients occurred on heavy drinking days. Although we did not track re-injury in this study, any intervention that reduces the number of heavy drinking days has the potential to reduce the likelihood of re-injury in the future, an effect observed in an earlier study of a brief intervention in a trauma center (Gentilello et al., 1999).

Limitations

Several limitations in this study must be acknowledged. First, power to detect differences was limited due to the small sample size. The small sample size also suggests caution against over-interpreting results from the current study. A second limitation is the lack of collateral interviews for independent verification of self-report data. Third, while the between-group differences

TABLE 3
Percentage of patients drinking below low-risk guidelines¹

Treatment condition	Baseline ²		Follow-up ³	
	Within limits	Above limits	Within limits	Above limits
Bibliotherapy	33% (5/15)	67% (10/15)	80% (8/10)	20% (2/10)
Assessment-only	53% (8/15)	47% (7/15)	71% (5/7)	29% (2/7)

¹Defined as 14 drinks or less per week for men, and seven drinks or less for women, following guidelines proposed by the National Institute on Alcohol Abuse and Alcoholism (NIAAA, 1992).

²Baseline percentages based on participants who completed both baseline assessment and follow-up ($n = 30$).

³Follow-up percentages based on participants who were drinking above low-risk levels at baseline (7 in assessment-only, 10 in bibliotherapy). In both conditions there were only two people drinking above low-risk limits at follow-up. In other words, five of seven controls (71%) and eight of 10 in the bibliotherapy condition (80%) went from risky to low-risk levels.

observed at baseline were not found to be significantly different statistically, there were clinically important differences between the two groups, with the bibliotherapy group appearing worse on most measures. This problem could have been avoided through use of urn randomization, a procedure that retains random allocation while ensuring that groups are balanced on key variables (Stout, Wirtz, Carbonari, & Del Boca, 1994). Also, the current study utilized an extremely brief (16-page) self-help manual, whereas previous studies of bibliotherapy have often used much longer books, which may limit comparability of findings. A final consideration when interpreting the results of the current study is the short length of follow-up assessment, which occurred on average about five months following hospitalization. It is possible that any changes in drinking behavior made at this point might not be lasting changes, as alcohol use by trauma patients tends to decrease after injury, but may return to pre-injury levels in the absence of an intervention (Dunn et al., 2003; Gentilello et al., 1999).

Conclusions

A majority of trauma center patients believe that hospital staff should discuss alcohol use with patients, according to a recent survey, which also found high levels of patient acceptance of brief counseling, reading materials, and information on self-help groups (Schermer, Bloomfield, Lu, & Demarest, 2003a). However, in addition to being acceptable to patients, potential brief interventions must be feasible for clinicians. Two conferences were recently convened by the Centers for Disease Control to address alcohol problems among patients in emergency departments and trauma centers. A major conclusion to come out of these conferences is that because time and budget constraints are paramount in these settings, research-based treatments must be easy to learn, require minimal training time, and have the ability to be widely implemented by a range of practitioners (Hungerford, & Pollock, 2003). The current study investigated bibliotherapy as a potential means by which to reach a large number of problem drinkers in order to address feasibility concerns of medical staff who work in these settings. This pilot study suggests that the provision of self-help materials in the absence of counseling may not be enough to foster behavior change beyond that which occurs as a result of hospitalization and a brief assessment of drinking. This finding is in line with a number of previous studies on the use of self-help materials with drinkers identified through screening that have found bibliotherapy to be no more effective than assessment alone (e.g., Richmond, Heather, Wodak, Kehoe, & Webster, 1995; Scott, & Anderson, 1990). It is notable that in the field of smoking cessation, bibliotherapy has not been found efficacious as a stand-alone intervention (Curry, Ludman, & McClure, 2003). It is possible that bibliotherapy for alcohol problems may also work best when supplemented by personalized contact or brief counseling.

Clinical Implications for Healthcare Professionals

This study holds several implications for healthcare professionals. First, medical patients are generally willing to discussing alcohol use with medical staff. The current intervention was well-received by patients, who reported high levels of comfort with the intervention, finding the self-help manual useful, and believing that the intervention should continue to be offered.

Second, brief intervention is cost-effective and can be conducted with only modest investments of staff time. For example, Schermer and colleagues (2003a) reported that in an 8-week time period, one part-time staff member was able to approach 90% of 163 patients admitted to a level 1 trauma center, of whom 70% were successfully screened with the AUDIT, resulting in 51 patients with potential problematic alcohol use. Several trauma centers are now providing screening and brief intervention using a half-time staff member (Schermer, Moyers, Miller, & Bloomfield, 2006). This modest investment pays off: a cost-benefit analysis has shown that each dollar invested in brief intervention could yield more than fourfold savings in future health care costs (Fleming et al., 2002).

Finally, resources are readily available for healthcare professionals interested in implementing screening and brief interventions for alcohol use. The National Institute on Alcohol Abuse and Alcoholism (NIAAA) has released an updated guide to help healthcare professionals identify and care for patients with heavy drinking and alcohol use disorders. "Helping Patients Who Drink Too Much: A Clinician's Guide" provides a research-based approach to alcohol screening and brief interventions. Alcohol screening can be conducted either with a single question about heavy drinking days, or through the use of a 10-item questionnaire (available in both English and Spanish). If a patient drinks heavily, the guide shows clinicians how to assess for symptoms of alcohol abuse or dependence. It provides patient education charts about U.S. adult drinking patterns and alcohol content in different beverage types and serving sizes, a section about prescribing medications for alcohol dependence, forms for recording patient baseline and progress notes, and resources for making referrals to treatment and support groups. The guide is available online at no charge at <http://www.niaaa.nih.gov>. Printed copies, with pocket guides, can be ordered at the same Web site or by calling the NIAAA at 301-443-3860.

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